

We claim:

1. Isolated polypeptide having trans-2-enoyl-CoA reductase (TER) (EC 1.3.1.44) activity comprising a polypeptide sequence selected from the group comprising

5

- a) the sequence as described by SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11,
- b) sequences having an identity of at least 60% to the sequence as described by SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11, and
- c) sequence comprising at least 10 consecutive amino acid residues of the sequence as described by SEQ ID NO: 2.

2. Isolated nucleic acid molecule comprising a sequence selected from the group consisting of

15

- a) the sequence as described by SEQ ID NO : 1, SEQ ID NO : 4, SEQ ID NO : 6, SEQ ID NO : 8 or SEQ ID NO : 10,
- b) sequence encoding a polypeptide as claimed in claim 1, and
- c) sequences which under stringent conditions hybridise with a sequence encoding a polypeptide as claimed in claim 1.

3. A method of increasing the total oil content in a plant organism or a tissue, organ, part, cell or propagation material thereof, comprising

25

- a) the transgenic expression of a polynucleotide SEQ ID NO : 1, SEQ ID NO : 4, SEQ ID NO : 6, SEQ ID NO : 8 or SEQ ID NO : 10 in said plant organism or in a tissue, organ, part, cell or propagation material thereof, and
- b) the selection of plant organisms in which - in contrast to or comparison with the starting organism - the total oil content in said plant organism or in a tissue, organ, part, cell or propagation material thereof is increased.

4. The method as claimed in claim 3, wherein the TER protein is encoded by a nucleic acid sequence selected from the group consisting of:

35

- a) a nucleic acid sequence comprising a nucleotide sequence which is at least 60% identical to the nucleic acid sequence of SEQ ID NO : 1, SEQ ID NO : 4, SEQ ID NO : 6, SEQ ID NO : 8 or SEQ ID NO : 10;
- b) a nucleic acid sequence comprising a fragment of at least 30 nucleotides of a nucleic acid sequence comprising the nucleotide sequence of SEQ ID NO : 1, SEQ ID NO : 4, SEQ ID NO : 6, SEQ ID NO : 8 or SEQ ID NO : 10;
- c) a nucleic acid sequence which encodes a polypeptide comprising an amino

acid sequence at least about 60% identical to the amino acid sequence of SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11 and

- 5 d) a nucleic acid sequence which encodes a fragment of a polypeptide comprising the amino acid sequence of SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11 or wherein the fragment comprises at least 10 contiguous amino acid residues of the amino acid sequence of SEQ ID NO : 2.

10 5. A method as claimed in claim 3 or 4, wherein the plant is an oil crop.

6. A method as claimed in claim 5, wherein the total oil content in the seed of a plant is increased.

15 7. An expression cassette comprising in combination with a regulatory sequence a nucleic acid sequence selected from the group consisting of:

- 20 a) a nucleic acid sequence comprising a nucleotide sequence which is at least 60% identical to the nucleotide sequence of SEQ ID NO : 1, SEQ ID NO : 4, SEQ ID NO : 6, SEQ ID NO : 8 or SEQ ID NO : 10,
- b) a nucleic acid sequence comprising a fragment of at least 30 nucleotides of a nucleic acid sequence comprising the nucleotide sequence of SEQ ID NO : 1, SEQ ID NO : 4, SEQ ID NO : 6, SEQ ID NO : 8 or SEQ ID NO : 10,
- 25 c) a nucleic acid sequence which encodes a polypeptide comprising an amino acid sequence at least about 60% identical to the amino acid sequence of SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11, or
- d) a nucleic acid sequence which encodes a fragment of a polypeptide comprising the amino acid sequence of SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11 wherein the fragment comprises at least 10 contiguous amino acid residues of the amino acid sequence of SEQ ID NO : 2,

35 wherein said regulatory sequence is capable of mediating expression of said nucleic acid sequence in a plant.

8. An expression cassette according to claim 7, wherein said nucleic acid sequence encodes a polypeptide comprising the amino acid sequence set forth in SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11.

40 9. An expression cassette as claimed in claim 7 or 8, wherein the promoter is a seed-specific promotor.

10. A genetically modified plant organism or tissue, organ, part, cell or propagation material thereof, comprising a polypeptide as defined in SEQ ID NO : 2, SEQ ID NO : 5, SEQ ID NO : 7, SEQ ID NO : 9 or SEQ ID NO : 11 or an expression cassette as claimed in any of claims 7 to 9.
5
11. A genetically modified plant organism as claimed in claim 10, wherein the plant organism is selected from the group of the oil crops consisting of *Borago officinalis*, *Brassica campestris*, *Brassica napus*, *Brassica rapa*, *Cannabis sativa*, *Carthamus tinctorius*, *Cocos nucifera*, *Crambe abyssinica*, *Cuphea species*, *Elaeis guinensis*, *Elaeis oleifera*, *Glycine max*, *Gossypium hirsutum*, *Gossypium barbadense*, *Gossypium herbaceum*, *Helianthus annuus*, *Linum usitatissimum*, *Oenothera biennis*, *Olea europaea*, *Oryza sativa*, *Ricinus communis*, *Sesamum indicum*, *Triticum species*, *Zea mays*, walnut and almond.
10
12. The use of a genetically modified plant organism or tissue, organ, part, cell or propagation material thereof as claimed in claim 10 or 11 for the production of triacylglycerols, diacylglycerols, monoacylglycerols, phospholipids, waxesters and/or fatty acids or derivatives of the above.
15